Northwest **Power** and **Conservation** Council

December 3, 2024

MEMORANDUM

TO: **Council Members**

FROM: **Joe Walderman, Resource Analyst**

SUBJECT: **Report on Regional Demand Response Efforts**

BACKGROUND:

Presenter: Joe Walderman

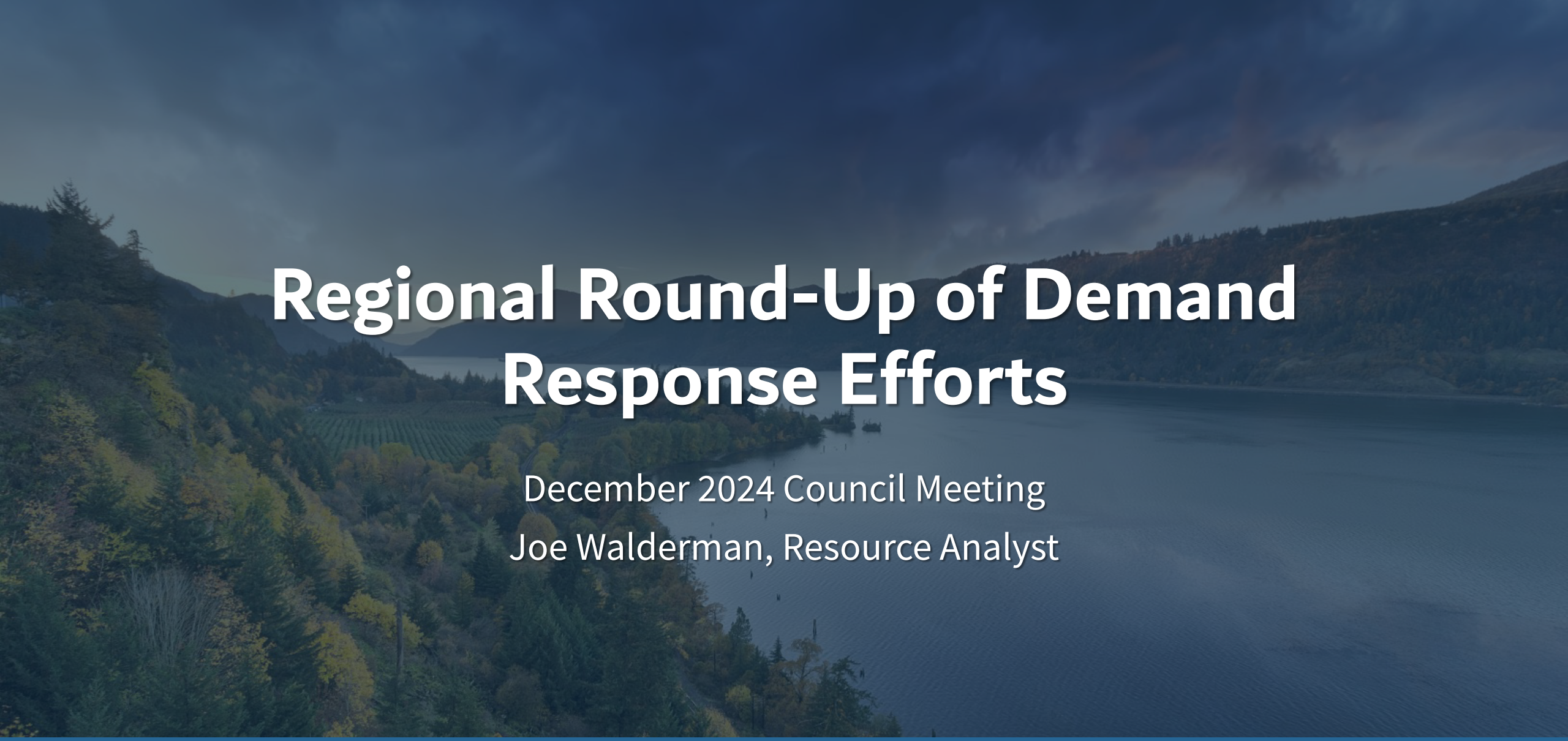
Summary: The 2021 Power Plan included a potential assessment for demand response (DR) that assessed DR alongside generating resources and energy efficiency. The plan concluded that low-cost, regularly deployable DR is needed and can provide grid flexibility especially during ramping and peaking periods. This includes DR products like time-of-use rate programs and demand voltage regulation. This presentation will provide a "regional round-up" that will showcase the progress made across the region to develop demand response programs and how they support either regional or individual utility needs. The results of this roundup will help provide input to the Council's next regional power plan.

Relevance: The 2021 Power Plan recommended that Bonneville and the region's utilities pursue demand response, especially low-cost DR that provides benefit during the morning and evening ramping periods. In addition, the Plan provided several research and development recommendations in support of DR. This presentation provides insight on how the region is progressing against those recommendations. Additionally, understanding the state of demand response will also provide important context for how demand response will be explored in the coming Power Plan.

Workplan: A.1.2 Track demand response efforts throughout the region and provide periodic updates to the Council.

Background: The Northwest's abundant low-cost hydropower provides significant flexibility in the power supply. As a result, the region has historically had less need for demand response compared to other parts of the country and thus has deployed less. However, new spiking loads have imposed new challenges on the grid, and decarbonization policies are pushing for cost effective carbon-free resources. Further, the growth of new flexible loads such as grid-connected water heaters, smart thermostats, electric vehicle chargers, and home battery storage have expanded the opportunities for demand response. Utilities in the region have increasingly started adopting demand response programs to take advantage of flexible loads for peak reduction and energy shifting.

In the 2021 Power Plan the Council developed a demand response potential assessment, and then resource strategy recommendations for regional utilities and regulators, as well as specific recommendations to Bonneville Power Administration.



Regional Round-Up of Demand Response Efforts

December 2024 Council Meeting

Joe Walderman, Resource Analyst

Northwest **Power** and **Conservation** Council

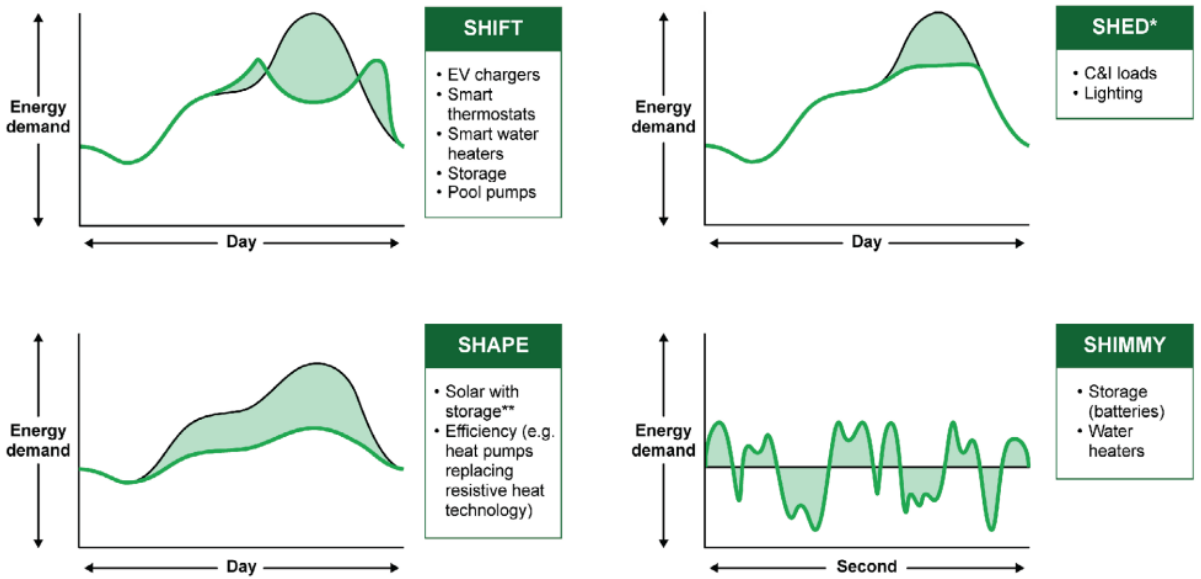
Agenda/Overview

- DR in the 2021 Plan
- DR Drivers
- Regional Roundup: DR Products & Programs
  - IOUs
  - Large Utilities
  - Small Utilities
- Learnings

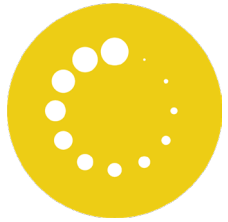
What is Demand Response?

"Demand response is a non-persistent intentional change in net electricity usage by end-use customers from normal consumptive patterns in response to a request on behalf of, or by, a power and/or distribution/transmission system operator. This change is driven by an agreement, potentially financial, or tariff between two or more participating parties"

Most commonly used to reduce or shift load at times of peak demand or hours of greatest need



2021 Plan Resource Strategy – Includes DR

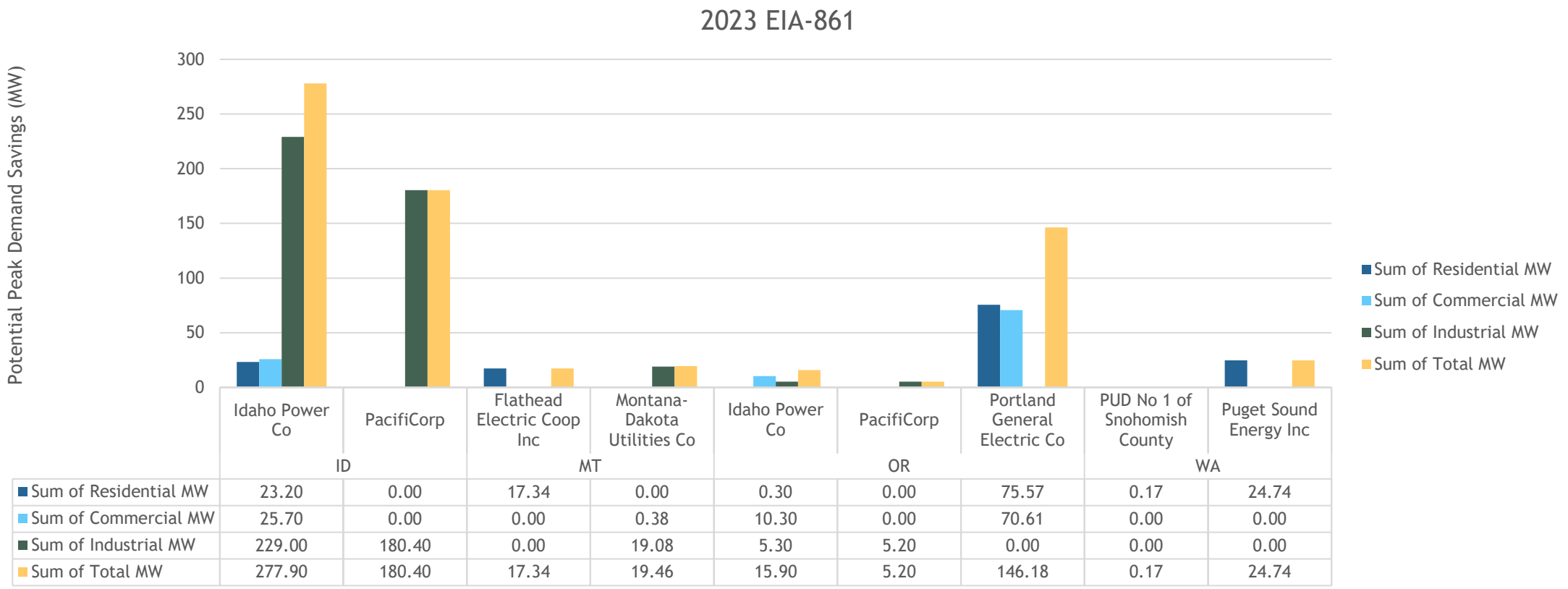


- The previous three power plans recommended the region develop and implement demand response programs
- The 2021 Plan recommended the region acquire demand response that is low cost, frequently deployable, and with minimal customer impact. Two types identified:
  - Residential Time-of-Use (TOU) – 200 MW
  - Demand Voltage Reduction (DVR) – 520 MW
- Estimated 3,721 MW of summer DR potential and 2,761 MW of winter potential

DR Roundup - Process

- In 2023, the Council staff produced the first regional Demand Response “roundup”
- The goal is to continue this annually
- The roundup is intended to gather information from utilities about their DR activities and programs
  - What is going on with DR in the region?
  - How are we doing relative to the DR portion of the Plan’s resource strategy?
  - General DR information sharing
- This Annual DR Roundup Meeting was held on with the Demand Response Advisory Committee on December 2
  - Survey sent out to utilities in November

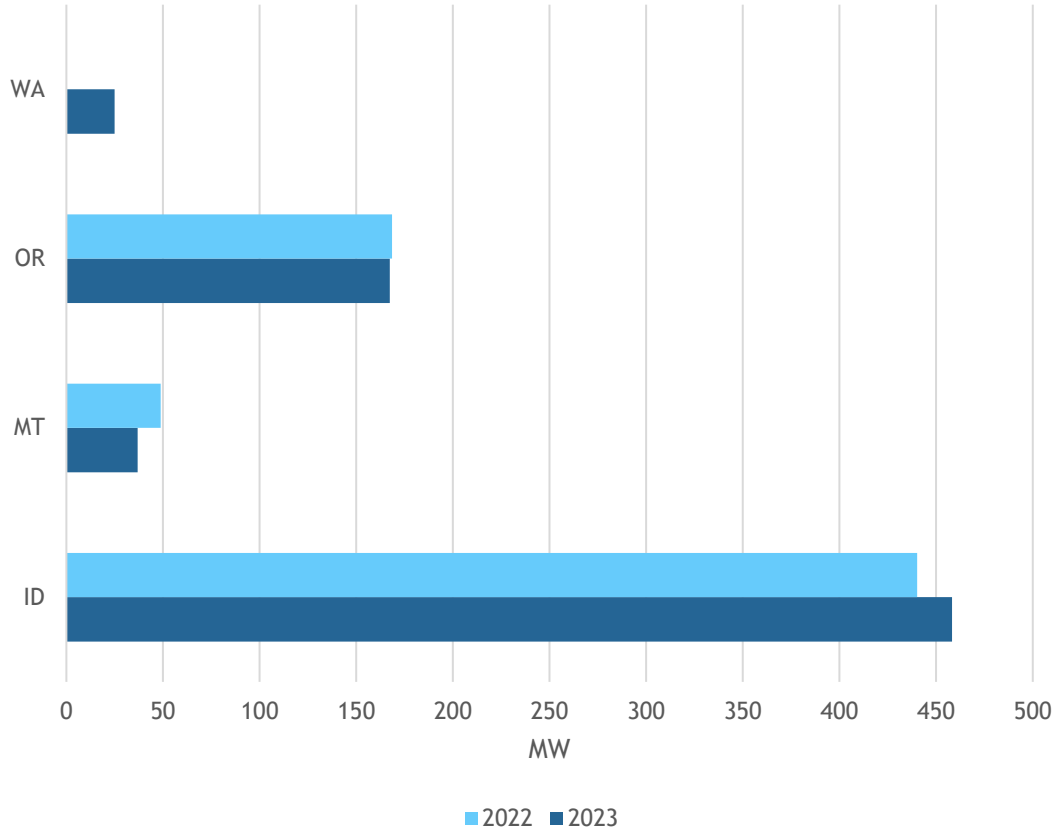
Reported DR for the Region – 2023 EIA-861



	Idaho Power Co	PacifiCorp	Flathead Electric Coop Inc	Montana-Dakota Utilities Co	Idaho Power Co	PacifiCorp	Portland General Electric Co	PUD No 1 of Snohomish County	Puget Sound Energy Inc
	ID		MT		OR			WA	
Sum of Residential MW	23.20	0.00	17.34	0.00	0.30	0.00	75.57	0.17	24.74
Sum of Commercial MW	25.70	0.00	0.00	0.38	10.30	0.00	70.61	0.00	0.00
Sum of Industrial MW	229.00	180.40	0.00	19.08	5.30	5.20	0.00	0.00	0.00
Sum of Total MW	277.90	180.40	17.34	19.46	15.90	5.20	146.18	0.17	24.74

Demand Response in the Region: EIA-861

- The region had 687 MWs as of 2023 reporting, up from 657 MWs in 2022
- Utilities reporting data
  - Idaho Power
  - PacifiCorp
  - Flathead Electric Co-op
  - Snohomish PUD
  - PGE
  - PSE



DR in the Region: Overview

- At least 745 MW of DR in the region 2024 YTD
- Smart thermostat, 2 programs 2 pilots
- Water heater, 2 pilots (plus NEEA CTA-2045 study)
- Battery, 1 program, 1 pilot (2 programs launching 2025)
- EV charging, 1 program, 3 pilots (1 program launching 2025)
- TOU, 5 programs, 3 pilot (1 transitioning to program)
- Behavioral
- Irrigation, 2 programs

What We're Seeing in DR

DR Portfolio Highlights

Still dominated by irrigation but diversifying

- Residential automated programs growing (EV charging, smart thermostats, water heaters)
- Customized curtailment programs targeting large loads
- Behavioral programs growing, encouraging customers to adjust energy usage through peak time rebates and time of use rates

Pilots to Programs

Not just demonstration and pilots anymore, full programs being deployed and expanded

Most of DR coming from big IOUs

670 MWs of the 2023 EIA-861 data was reported by IOUs

What's Driving DR in the Region?

Policy	• Washington CETA • Oregon's Clean Energy Plan
Electrification	• Vehicles and Buildings
Extreme Weather	• Heat waves, ice storms, high winds, droughts
Volatile Market Prices	• Some utilities have seen costs as high as $1,000/MW
Transmission & Distribution	• PGE has a need for available transmission capacity • PSE has non-wire solution needs
IRP	• Large amounts of demand response starting to get picked up in IRPs

Puget Sound Energy

Targeted Demand Response Capacity Goals (MW)		
Year	Target	Achieved
2023	5	23 ★
2024	40	59 ★
2025	86	On track

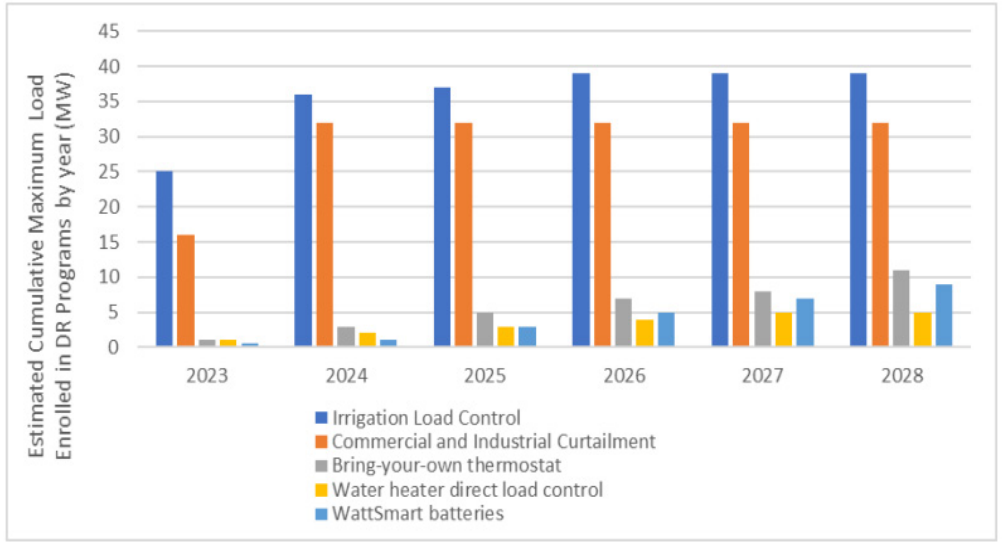
- Launched Flex programs in 2023
  - Flex Smart (BYOT)
  - Flex EV
  - Flex Rewards (Opt In behavioral)
  - Flex Events (Opt Out behavioral)
  - Flex Batteries (launched in Oct)
- Launching water heater program in January, CTA 2045
- Building more robust TOU
- 59 MW of average event capacity achieved in 2024 with 70,000 enrolled
- On track for goal of 86 MW in 2025
- Developing MF water heater program for daily load shift flex
- Implementing and extending VPP capability (Using DERs, such as PSE owned and Non-PSE owned batteries, to augment the electric grid during a specific day and time window.)
  - Partnered with Uplight to manage it
  - Hopes to leverage VPP to bring additional value such as support to wholesale market, energy arbitrage, local grid system capacity relief, and ancillary services
- Goal of sourcing 10% of winter and summer peak electric load through demand flexibility by 2027 (approximately 500 MW)

Idaho Power

- 320 MW of DR capacity
- C&I demand curtailment program (30 MW)
- Residential AC program
- New residential ToU, but not much participation so far
- Fully implemented DVR program not included in reported 320 MW
- Examining
  - BYOT program in 2025
  - Expand C&I
  - Customer batteries (BYOD)
- IRP looks to add 20 MW in coming years
- Challenges
  - Getting value proposition right

PacifiCorp

- Rocky Mountain Power
  - 200 MW irrigation program been around for 10+ years
  - Expanded Wattsmart Battery program to Idaho (deployed 63 times last year)
    - Batteries cycled 5-15 mins for peak management, frequency response and contingency reserves, and transmission relief
  - C&I DR (Wattsmart Business DR)
    - Automatic dispatch without advanced notice and a 50 second response time.
  - Cool Keeper AC Switch program
- Pacific Power
  - Launched tailored C&I offering and irrigation program in 2023 and expect substantial growth
  - Cancelled combined water heater and thermostat program in Nov
    - Planning estimates not lining up with reality
  - Introducing 3 new programs that they are expanding from RMP
    - Battery
    - AC Switch
    - EV charging



Portland General Electric

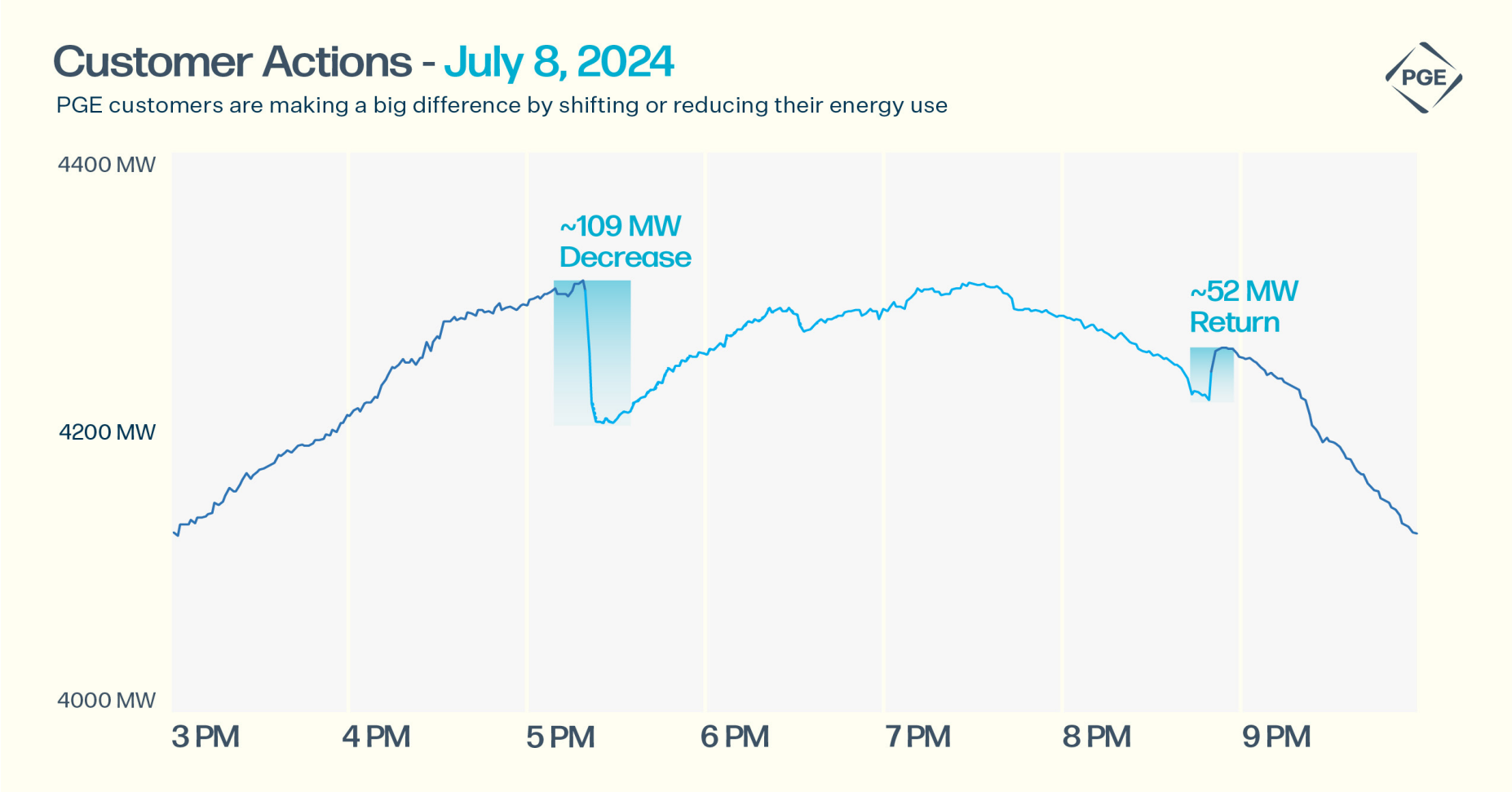
- Focusing on:
  - Rapid load growth
  - Extreme and uncertain weather
  - Rapid decarbonization
- Two-way grid architecture of ADMS and DERMS software
- 106 MW of flex load capacity
- Smart thermostat and battery pilots evolving into full programs
- Goal of 2,000 MW VPP by 2030, majority of it looking like DR

2025-2026 Flexible Load Multi-year Plan | Introduction

Table 2. Summary of Flex Load Capacity (forecasted for 2025-2026)

	Summer Capacity			Winter Capacity		
Activity	2024	2025	2026	2024	2025	2026
Residential Smart Thermostats	43.7	48.1	52.5	9.0	9.9	10.8
Peak Time Rebates	15.4	16.1	16.6	11.5	12.0	12.4
Time of Day[6]	2.5	4.1	5.6	–	–	–
Energy Partner on Demand	38.8	41.3	43.8	31.5	33.5	35.5
Multi-family Water Heating[7]	2.0	2.0	2.3	2.5	2.5	2.8
Energy Partner Smart Thermostat	2.2	2.1	2.8	0.5	0.6	0.7
Residential EV Charging[8]	1.8	2.6	3.3	1.9	2.7	3.5
Flex Load Capacity (MW)[9]	106.5	116.3	126.9	56.9	61.2	65.7

DR in Action


Customer Actions - July 8, 2024
PGE customers are making a big difference by shifting or reducing their energy use
PGE
4400 MW
4200 MW
4000 MW
~109 MW Decrease
~52 MW Return
3 PM
4 PM
5 PM
6 PM
7 PM
8 PM
9 PM

Avista

- ToU and Peak Time Rebate pilots started June 2024
- Building out ADMS
- IRP preferred resource strategy demand response reduces system peak load 4% by 2045, including 60 MW by 2045
  - Almost every DR program was picked up in draft IRP (final in January)
- Energy storage program in short term, approaching commission with application soon
- 30 MW bilateral contract with industrial customer

Bonneville

- Bonneville's 2024 Resource Program suggested 300 MW DVR by 2027
  - DR resources were selected to meet short-duration energy needs in the months with highest market prices
  - Put out outreach material Jan 2024
  - Bonneville staff says not on track to meet target
- DVR can be used every day, not limited by potential consumer discomfort
- Looking at DR technologies that can be deployed frequently, providing an energy resource rather than capacity

Large Public Utilities

Seattle City Light

- Two-year BYO Thermostat pilot with 3000 customers and seven events in 2024 (~1 MW)
- Targeting 19 MW DR and 7 MW ToU by 2033
- ToU planned for 2025
- Large C&I program in 2025
- Previously have not needed DR but that is changing due to electrification and volatile market prices

Tacoma PUD

- Ending successful pilot on CTA-2045 water heaters and looking to expand
- Looking to do pilots for industrial load curtailment, peak time rebates, BYOT, and EV program directed at fleet customers
- Goals of 2 MW by end of 2026 and 10 MW by 2046

SnoPUD

- FlexResponse BYOT and EVSE pilot just ended
- FlexPeak Commercial Peak Pricing pilot

Clark PUD

- Operating EV Charging pilot program targeting 800 EVs
- Industrial DR pilot with 10 MW of callable load, performed 6 days of calls summer 2024, had very good participation

Small Public Utilities

- Flathead electric has been operating TOU rate, reporting 17 MW
- Some smaller utilities doing DVR on their own like City of Richland
- Many small publics investigating smart thermostat programs
- Seeing difficulties of spreading administrative cost over small customer base

Opportunities and Challenges

Value of DR is Growing/Changing

- Utilities using DR for grid services like frequency response, contingency reserves (Pac)
- Long DR events (4-8 hours) are valuable for hydro utilities (SCL)
- Utilities looking at demand response for non-wires solutions (PSE)

Challenges

- DR is new in the region and there is limited understanding by customers and within the utility
- Finding the right value proposition and understanding what is the true avoided cost of DR compared to building another resources
- Lack of standardized approach to enroll in various programs or with various device types

Questions/Comments?

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